Creating
COASTAL
STEWARDSHIP
through Science

Observing Pacific Gray Whales

Post-Visit Activities

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What Can We Learn from Our Field Trip to Observe Gray Whales?

Observations recorded at Point Reyes will be compiled into posters comparing and contrasting group findings. Results from Scavenger Hunt Activity will also be presented and discussed.

Time required: 2 hours

Location: classroom

Suggested group size: entire class

Subject(s): science

Concept(s) covered: gray whale biology, behaviors and migration, other marine species

Written by: Christie Denzel Anastasia, National Park Service

Last updated: 12/31/00

Student Outcomes

At the end of this activity, the students will be able to:

- Share results of gray whale field observations
- Reflect on Scavenger Hunt activities and their connection to observations made in the field

California Science Standard Links (grades 6-8)

This activity is linked to the California Science Standards in the following areas:

6th grade
- 5a- food webs
- 5b- organisms and the physical environment
- 5c- organisms can be categorized by functions
- 5e- the number and types of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition
- 7b- appropriate tools and technology to perform tests, collect and display data
- 7c- develop qualitative statements about the relationships between variables
- 7d- communicate the steps and results from an investigation
- 7e- evidence is consistent with a proposed explanation

	7f- interpret a simple scale map
	7h- identify changes in natural phenomena over time
7th grade	7a- appropriate tolls and technology to perform tests, collect and display data
	7c- communicate logical connections
	7e- communicate the steps and results from an investigation
8th grade	9b- evaluate the accuracy and reproducibility of data

National Science Standard Links (grades 5-8)

This activity is linked to the national science standards in the following areas:

- Content Standard A - Use appropriate tools and techniques to gather, analyze, and interpret data; think critically and logically to make the relationship between evidence and explanations; recognize and analyse alternative explanations; use mathematics in all aspects of scientific inquiry; understandings about science and technology.
- Content Standard C - Populations and ecosystems

Materials

To be provided by the teacher:

- Large paper, one for each student team
- Art supplies, such as colored pencils or markers
- **Pre- and Post-Evaluation** activity sheets (see Procedure #7 in this lesson)

Procedures

1. Recall field trip experience

How many whales were seen?
Who was able to follow the same whale through a diving sequence?
What were some of the most impressive observations?
What other wildlife was seen?

2. Create posters

Have students group themselves according to their chaperone groups on the field trip. Distribute large sheets of paper and colored drawing tools. Ask students to fold paper in third and record the following information in each one of the sections:

first section: Record all the types of behaviors they observed by gray whales. Provide drawings or descriptions.

second section: Recreate a map similar to the "Whale Sighting Map" from their field journals. Students should note whale individuals, direction of travel, behavior of specific whales and time viewed (if available)

last section: Note other marine species sightings.

3. Group presentations

Each group will present their posters to the class. Their poster should be left in the front of the class.

5. Discussion

How do the maps from the individual student teams vary? How are they the same? What types of behaviors are most observable from their field trip? Were whales travelling in the opposite direction? Why? How could observations be made more "scientific"?

6. Scavenger Hunt Results

Divide students into different teams to represent each Scavenger Hunt sheet. Each team will share its information with the class on that specific sheet. Ask students to relate the information from the Scavenger Hunt sheet to observations made on the field trip.

7. Pre- and Post- Evaluation

If you saved the **Pre- and Post- Evaluation** Activity Sheets from the first pre-visit lesson, redistribute them to the original students. Explain that students may change their answers based on what they have learned in class and on their field trip. If you choose this option, have students write in a different color pen or pencil with the date written in that color.

If you did not save the original activity sheets, make copies for each student of the **Pre- and Post-Evaluation Activity** Sheet(located in the first pre-visit activity: "How Can I Learn About the Lives of Pacific Gray Whales?"). We would like to see the results of these evaluations! Please consider mailing completed Pre- and Post- evaluation activity sheets back to Point Reyes National Seashore. We would like to measure the success of your use of this curriculum in changing knowledge, skills, and abilities.

Mail to: National Park Service
Point Reyes National Seashore
Attn: Education Specialist
Point Reyes, CA 94956

How Can I Access More Information on Whales?

Students and teachers will explore Internet sites for up-to-date information on whale research and interactive educational opportunities.

Time required: 1 hour

Location: classroom, computer lab, home, library

Suggested group size: entire class

Subject(s): science, biology, information technology

Concept(s) covered: whale research, current news, stewardship opportunities

Written by: Christie Denzel Anastasia, National Park Service

Last updated: **09/23/01**

Student Outcomes

At the end of this activity, the students will be able to:

- Share information about whales with other students.
- Participate on interactive websites.
- Generate ideas for stewardship action plans.

California Science Content Standard Links (grades 6-8)

This activity is linked to the California Science Standards in the following areas:

6th grade
- 7b- appropriate tools and technology to perform tests, collect and display data.
- 7d- communicate the steps and results from an investigation
- 7e- evidence is consistent with a proposed explanation

7th grade
- 7a- appropriate tolls and technology to perform tests, collect and display data
- 7b- Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project
- 7c- Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from scientific evidence
- 7e- Communicate the steps and results from an investigation in written reports and verbal presentations

National Science Standard Links (grades 5-8)

This activity is linked to the National Science Standards in the following areas:

- Content Standard A - Identify questions that can be answered through scientific investigation, understanding about scientific inquiry.
- Content Standard C - Populations and ecosystems, Regulation and behavior.
- Content Standard F - Populations, resources, and environments, Risks and benefits.
- Content Standard G - Nature of science

Procedures

1. There are many options to explore this lesson depending on computer access at your school, student's home, or in the local community. See "Gray Whale Websites" following this lesson for Internet address suggestions.

2. Ideally students can form pairs and pick an address site to explore. Since individual student interests vary, the same web address will yield different discoveries. Students can report back to the class on what they have learned and how it applies to their studies on gray whales.

3. More focus may be required while students are exploring web sites. Instruct students that their discoveries should help generate ideas for Stewardship Action Plans (see lesson **How Can I Choose and Complete the Best Stewardship Project?**)

Gray Whale Websites

Gray Whale Tutorial

Address: http://www.slocs.k12.ca.us/whale/whale1.html

Summary: Information on gray whales written for students, produced by San Luis County Schools.

Note: From the homepage, topics include: What Is a California Gray Whale, Migration, Feeding, Whaling, Whale Behavior, Calving, Whale Blowing.

Journey North

Address: http://www.learner.org/jnorth/

Summary: Journey North tracks the northward spring migration of various species of animals including humpback and right whales, monarch butterflies, loggerhead sea turtles, and peregrine falcons. Journey North provides information on the best maps, "ask-the-expert", and informational reports put together by students in classrooms around the world. Fax subscriptions are available for teachers without e-mail capabilities.

Note: Navigate to the Online Orientation for topics such as About Journey North, Migrations and Signs of Spring 2000, Journey North News Calendar, Choose your Focus, Maps for Tracking Fall's Journey South, Practice Reporting Your Sightings Now, Talk to Other Teachers, Tips from Teachers.

Monterey Bay Aquarium

Address: http://www.montereybayaquarium.org/

Summary: A broad range of information and a good overview of complex issues facing the ocean.

Note: From the homepage, explore topics such as Learning Center (for teachers and students), Exhibits, Features, and Conservation (for Endangered Oceans site), and Our Seafood Policy.

National Resource Defense Council

Address: www.nrdc.org

Summary: Information on immediate threat to gray whale breeding habitat.

Note: click on "Save Gray Whale Nursery"

WhaleNet

Address: http://whale.wheelock.edu/

Summary: WhaleNet is an international collaboration of scientists, researchers, and computer technologists working to get real data in the classrooms. WhaleNet homepage includes teacher/student resources, opportunities to have marine mammal questions answered, and links to its' affiliates homepages.

Note: From the homepage you may choose Students, Teachers, or Public. Topics include Gray Whale Migration, Active Satellite Tags,Humpback Fluke Photo ID Curriculum Unit, "Ask a Scientist", Whale Watching Research Data.

Other Gray Whale website addresses:

A Gray Whale Story
Written by a Santa Maria 5th grader; on a student created school site, with a link to Santa Barbara Channel Islands.
http://www.sbceo.k12.ca.us/~eagles/graywhal.htm

American Cetacean Society
Gray Whale Migration charts and summaries of annual migration since 1985.
http://www.acs-la.org/GWCensus.htm

The International Fund for Animal Welfare
www.savebajawhales.com

Sea World
Review and compare growth and comparison charts for whales, elephants and humans.
http://www.seaworld.org/

How Can I Choose and Complete the Best Stewardship Project?

The final lesson for this unit synthesizes all previous learning experiences. Students have gained an understanding of Pacific gray whales and ocean ecology. Now it's time to take action in making oceans healthier places for whales, dolphins, porpoises, and all the organisms that depend on clean, safe water, from plankton to humans.

Time required: time varies

Location: classroom, community, or Point Reyes National Seashore

Suggested group size: entire class

Subject(s): biology, art, computer skills, community service

Concept(s) covered: stewardship, educating others, environmental responsibility

Written by: Lynne Dominy and Christie Denzel Anastasia, National Park Service

Last updated: 12/31/00

Student Outcomes

At the end of this activity, the students will be able to:

- Synthesize all other pre-visit, on-site, and post-visit lessons from this unit.
- Plan and implement an environmental stewardship activity to benefit the ecosystem they live in and depend upon.

National Science Standard Links

As a result of this activity, all students in grades 6-8 should develop:

- Content Standard F- Science in Personal and Social Perspectives; Populations, Resources, and Environments.

Vocabulary

stewardship

Procedures

1. Decide on lesson approach based on time limitations

Review the teacher resource **Observing Pacific Gray Whales: Environmental Stewardship Projects** following this lesson. This resource explores the range of Stewardship Projects your class can complete according to time constraints. There are many possibilities ranging from short lessons to more in-depth, interdisciplinary projects that may fulfill educational standards for other subject areas.

2. Prior to any lesson, introduce concept of environmental stewardship

Begin a discussion of who has responsibilities for natural resources. There are federal agencies such as the National Park Service and the United States Forest Service, state agencies such as Calfornia Fish and Game, and local organizations. Introduce the concept that organizations such as schools and individuals such as students also have responsibility.

Every day we decide on an individual level what our impact will be on the environment based on our actions. It's usually positive or negative, rarely neutral.

3. Lesson options

- **How to Positively Effect Species and Their Habitats** Activity Sheet
- Create Tools to Educate Others
- Implement a Community /School Project
- Participate in Volunteer Programs at Point Reyes National Seashore
- Support Stewardship Organizations and Be an Advocate for Your Beliefs

(see the teacher resource **Observing Pacific Gray Whales: Environmental Stewardship Projects** following this lesson for more details)

4. Assist with evaluation of "Creating Coastal Stewardship through Science"

Please share your project ideas and results! If you develop a website, host a "Coastal Stewardship Day", or participate in a beach cleanup, let us know by sending photos, stories, or student materials. Call (415) 464-5139 to leave a message with the Education Coordinator of Point Reyes National Seashore.

Observing Pacific Gray Whales
Environmental Stewardship Projects

How to Positively Affect Endangered Species and Their Habitats

One to two lessons

Students use the **How to Positively Affect Species and Their Habitats** activity sheet to learn more about a particular federally listed endangered whale. Based on that research, students devise action plans for which they assume responsibility for contributing toward healthy oceans.

Create Tools to Educate Others

Arranged in order of possible time commitment, shortest to longest

Lead a class discussion to brainstorm ways students can educate others. Use the list below to help students generate ideas. Once there are some ideas, decide upon which project can be completed within a designated timeframe. The next step is to have students create a "plan of action". What are all the things that need to be done, in which order do they need to be done, who is going to do them, and what are the deadlines? How can students not only teach about the resource, but also impart stewardship values? Remind students to think about any safety issues and address these as a group.

Educational tool ideas:

- Develop a newsletter or newspaper to distribute to other students.
- Build an exhibit that is displayed for a Parents' Open House.
- Paint a mural, draw posters, or create a website that encourages ocean stewardship.
- Interview researchers about a whale research project. Share the answers.
- Organize a Coastal Stewardship Contest. Have students define stewardship through writing essays or creating art, poetry, or music.
- Videotape your field trip and stewardship activities. Have the students narrate this video and develop a presentation for other students sharing what they have learned and accomplished.
- Create a mentoring program that enables your students to teach younger students about resources and their stewardship.

Implement a Community/ School Project

Arranged in order of possible time commitment, shortest to longest

Instruct students as a homework assignment to find at least one local environmental issue that is being discussed among community members. Students may gain this information by looking through newspapers, talking to their parents, watching the local news, or listening to a public radio station. The next day in class, all local environmental issues should be discussed to some extent. Choose one project around which students may design a stewardship project. What are the possible stewardship activities that can be completed by students, and/or their parents, and communities? Follow the ideas in the procedure above to create a "plan of action".

Community/ School Project Ideas:

- Adopt-A-Whale project
- Beach cleanup
- Water conservation at school and home.
- Create a green school: investigate recycling and composting facilities or water conservation. Have students write a plan about how to make your school more environmentally friendly. Have them take action and implement some of their ideas.

Participate in Volunteer Programs at Point Reyes National Seashore

2 hours, full day, or regular commitment on weekly/monthly basis

Students may participate in programs such as restoration, rehabilitation, or research projects. Consult with the Volunteer Coordinator or Education Specialist for the most recent options as projects can change according to time of year and staffing availability. One example of participating in a restoration project would be to remove exotic plants from natural areas. To participate in the habitat restoration projects at Point Reyes National Seashore call (415) 464-5139.

Support Stewardship Organizations and be an Advocate for Your Beliefs

1 lesson to lifelong commitment

Introduce students to the concept of advocacy. Have them research and represent the missions of local and national stewardship organizations. Examples include: the National Park Service, the Marine Mammal Center, the Humane Society, the Sierra Club, the National Parks and Conservation Association, the Audubon Society. Have students write letters to their local, state, and national government officials regarding stewardship issues or have them submit articles to local newspapers. Encourage students to form educated opinions and to voice them.

Name _____ **Date** _____

Activity Sheet

How to Positively Affect Species and Their Habitats

Choose on of the following federally endangered species occurring in offshore waters of Point Reyes National Seashore to answer the questions below:

☐ Blue whale	Balaenoptera musculus
☐ Humpback whale	Megaptera novaeangliae
☐ Sei whale	Balaenoptera borealis
☐ Fin whale	Balaenoptera physalus

INVESTIGATION

1. How have population numbers of this particular species changed over time?

2. What are the threats to this species as an individual?

3. What are specific threats to the ocean habitat for this species?

4. What is the federal government doing to increase population numbers?

5. What would be different in your life if you never had the opportunity to see these whales?

Activity Sheet

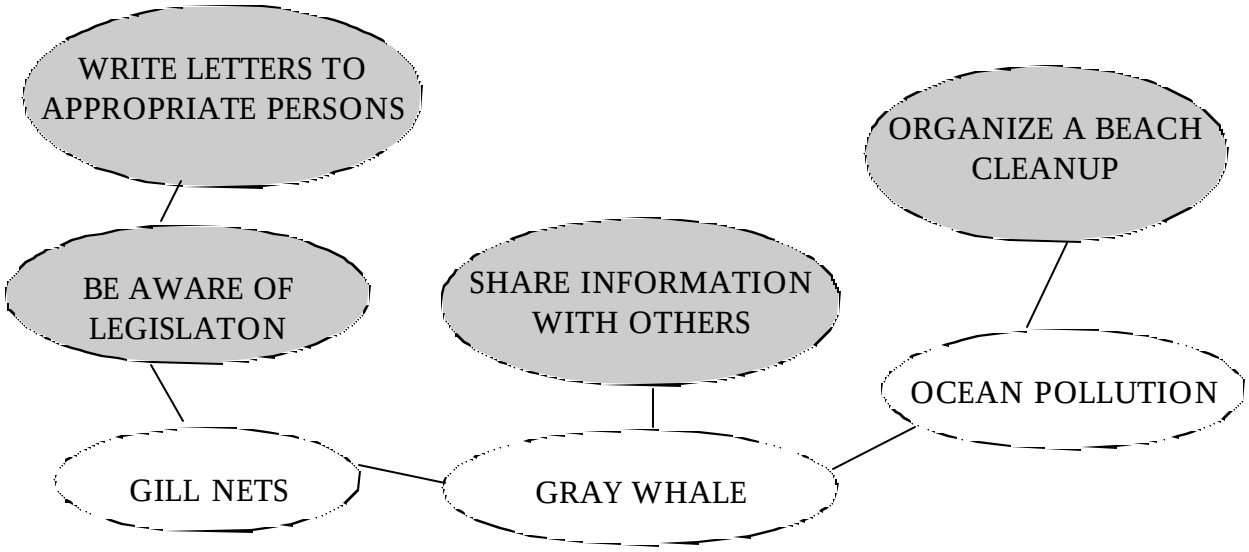
Name _____ **Date** _____

How to Positively Affect Species and Their Habitat (continued)

PROLEM SOLVING

Using a blank piece of paper, you will create a "mind-map".
Begin by writing the name of your species in the center of the paper and drawing a circle around it. Choose some of the threats to its survival and write those around the species name. Draw circles around each of the threats and connecting lines to the circle in the center. You should have something that looks like this:

Begin problem solving by thinking about actions that lessen the impact of specific threats. Write those actions in circles connected to the threat it seeks to solve. Example:



RESOLUTION

Review your mind-map to determine what type of actions YOU can take that will positively affect these species and/or their habitat.

Place "*" next to actions you are already doing,
place a "1" next to actions individuals can do,
place a "2" next to actions groups can do, and
place a "?" next to things you believe are not within your control.

Select an option and implement your plan.